OIPE JC48
FEB 12 2004
PATENT & TRADEMARK OFFICE

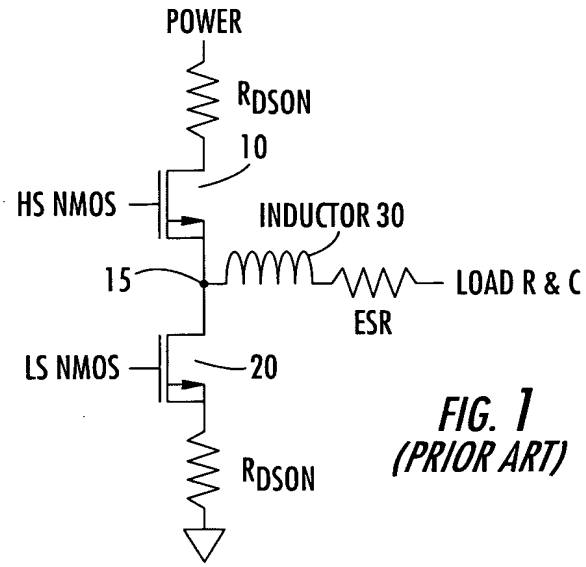


FIG. 1
(PRIOR ART)

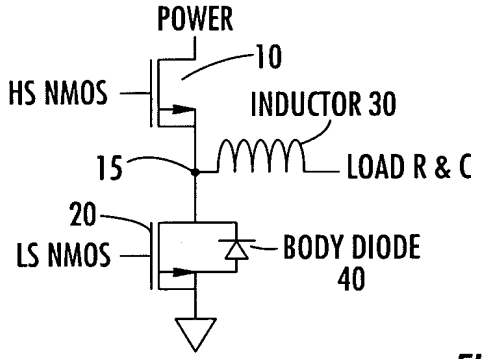


FIG. 2
(PRIOR ART)

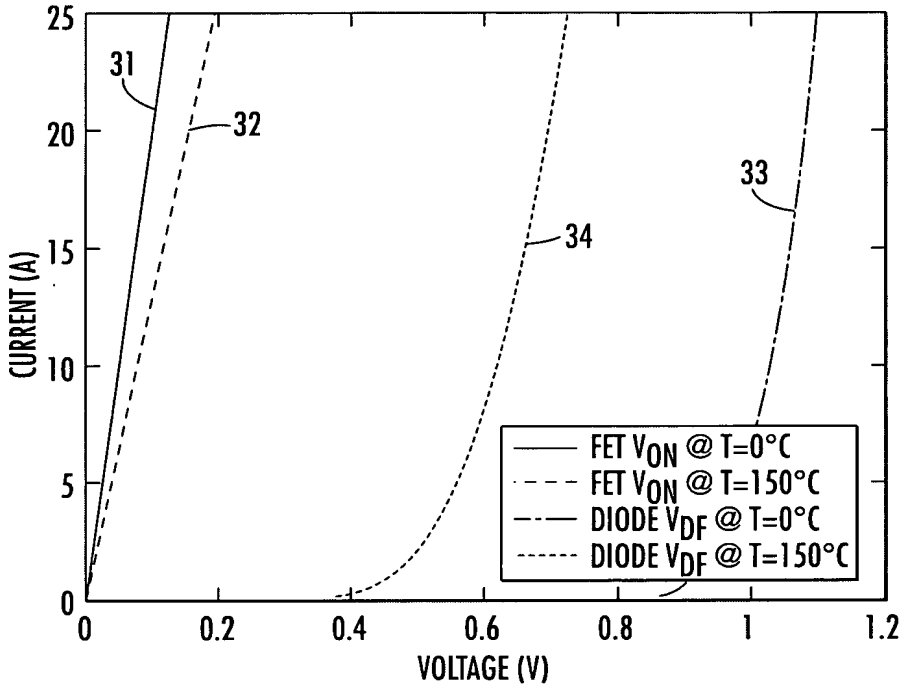

25
20
15
10
5
0
CURRENT (A)
0
0.2
0.4
0.6
0.8
1
1.2
VOLTAGE (V)
31
32
33
34
FET V_{ON} @ T=0°C
FET V_{ON} @ T=150°C
DIODE V_{DF} @ T=0°C
DIODE V_{DF} @ T=150°C

FIG. 3

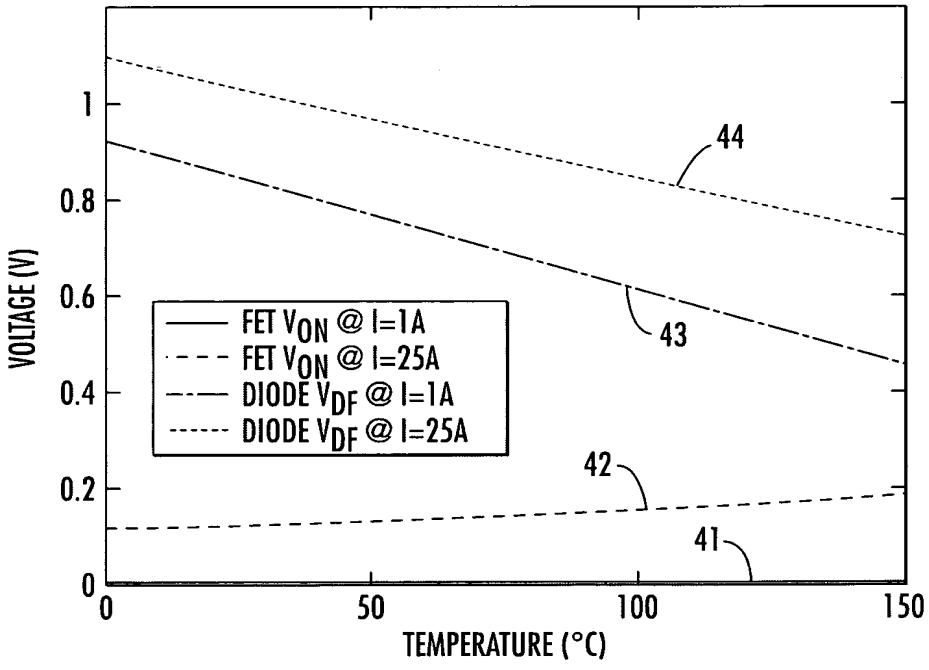

1
0.8
0.6
0.4
0.2
0
VOLTAGE (V)
0
50
100
150
TEMPERATURE (°C)
44
43
42
41
FET V_{ON} @ I=1A
FET V_{ON} @ I=25A
DIODE V_{DF} @ I=1A
DIODE V_{DF} @ I=25A

FIG. 4

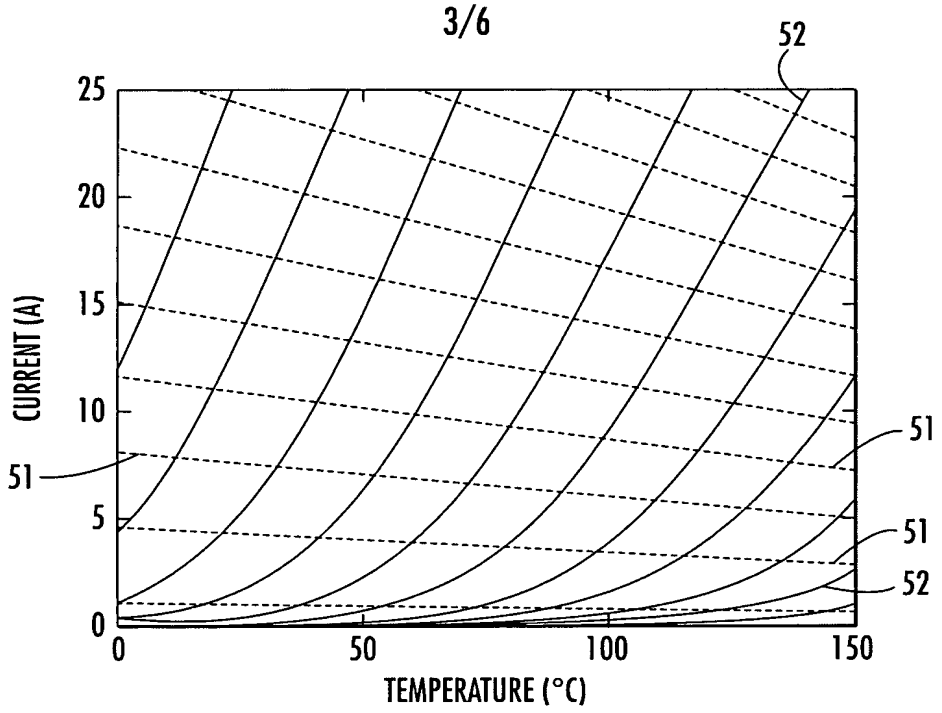

52
25
20
15
10
5
0
CURRENT (A)
51
51
51
52
0
50
100
150
TEMPERATURE (°C)

FIG. 5

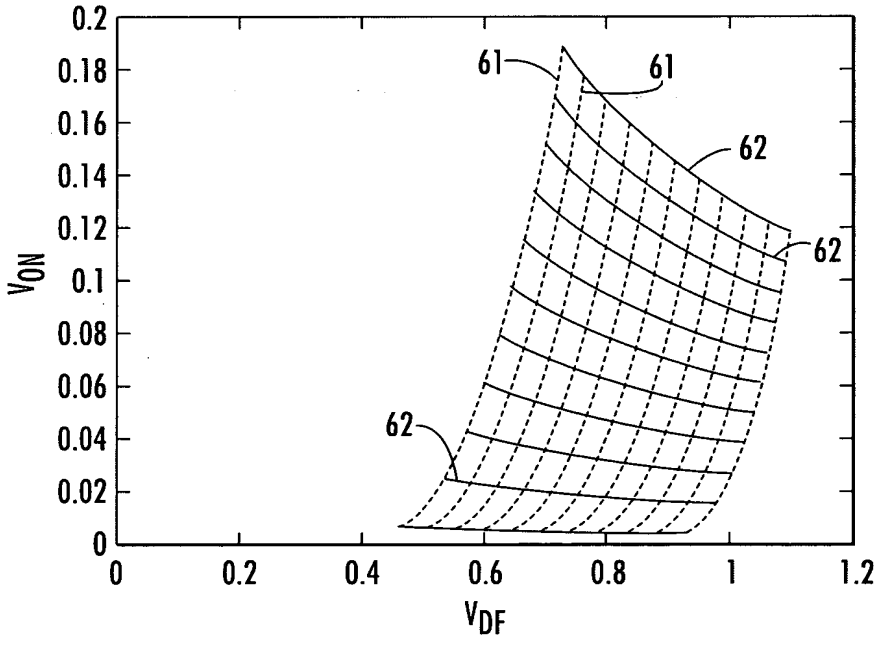

0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
V_{ON}
61
61
62
62
62
0
0.2
0.4
0.6
0.8
1
1.2
V_{DF}

FIG. 6

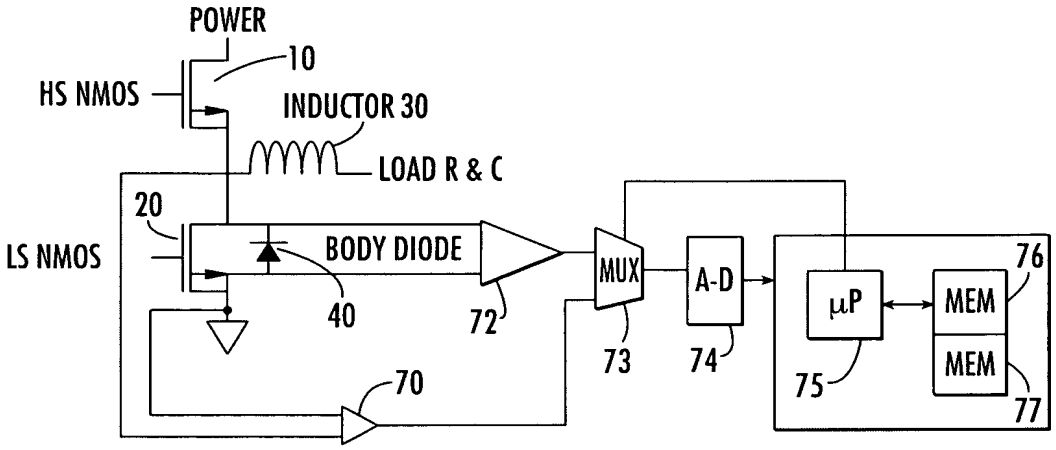

POWER
10
HS NMOS
INDUCTOR 30
LOAD R & C
20
LS NMOS
BODY DIODE
40
72
MUX
A-D
μP
MEM
MEM
76
73
74
75
77
70

FIG. 7

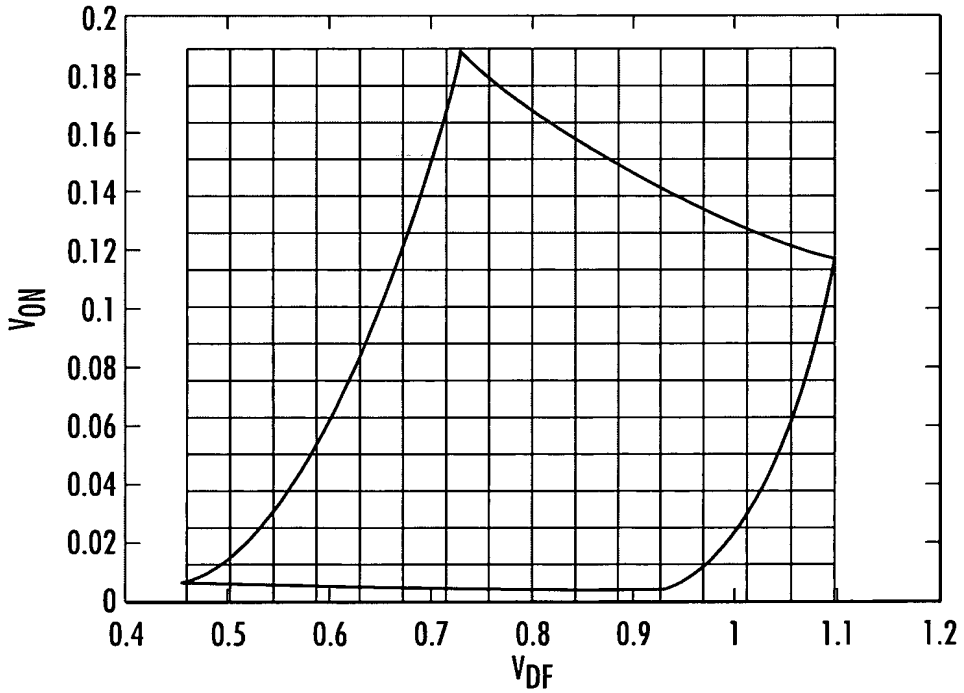
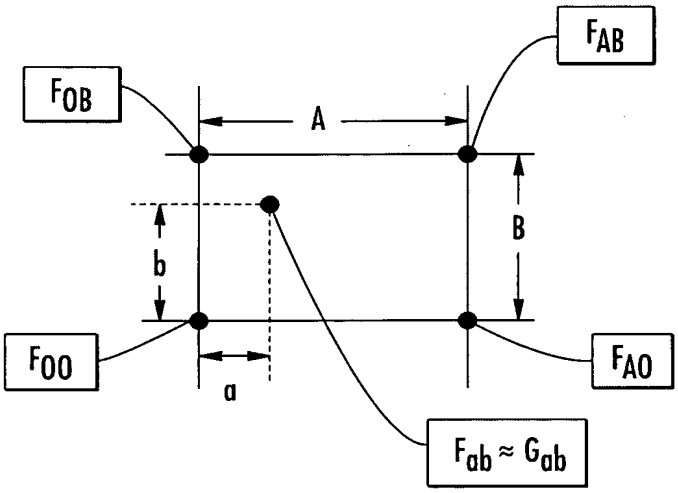
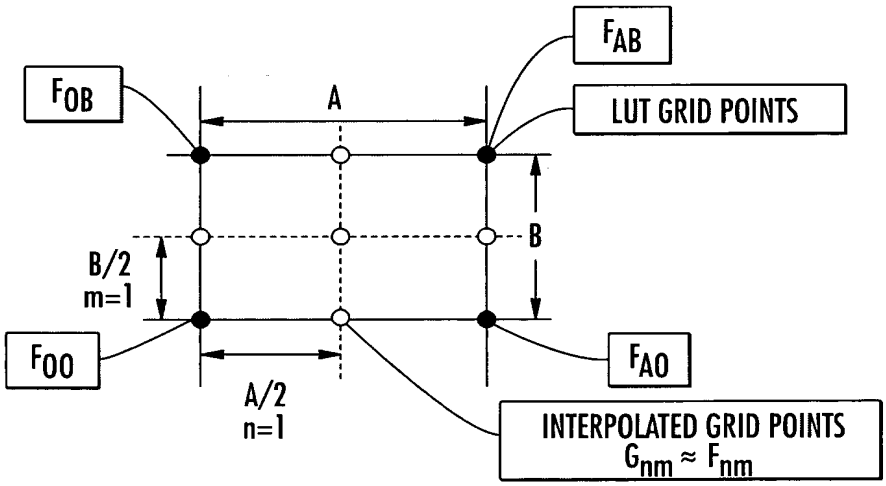

0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
V_{ON}
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
V_{DF}

FIG. 8



$$F_{ab} \approx G_{ab} = \{(A-a)(B-b)F_{OO}+(a)(B-b)F_{AO}+(A-a)(b)F_{OB}+abF_{AB}\}(AB)^{-1}$$
$$= \{(AB-aB-Ab+ab)F_{OO}+(aB-ab)F_{AO}+(Ab-ab)F_{OB}+ab\,F_{AB}+\}(AB)^{-1}$$

FIG. 9



$$F_{nm} \approx G_{nm} = \{(2-n)(2-m)F_{OO}+n(2-m)F_{AO}+m(2-n)F_{OB}+nmF_{AB}\}(4)^{-1}$$
$$n,m = \{0,1\}$$

FIG. 10

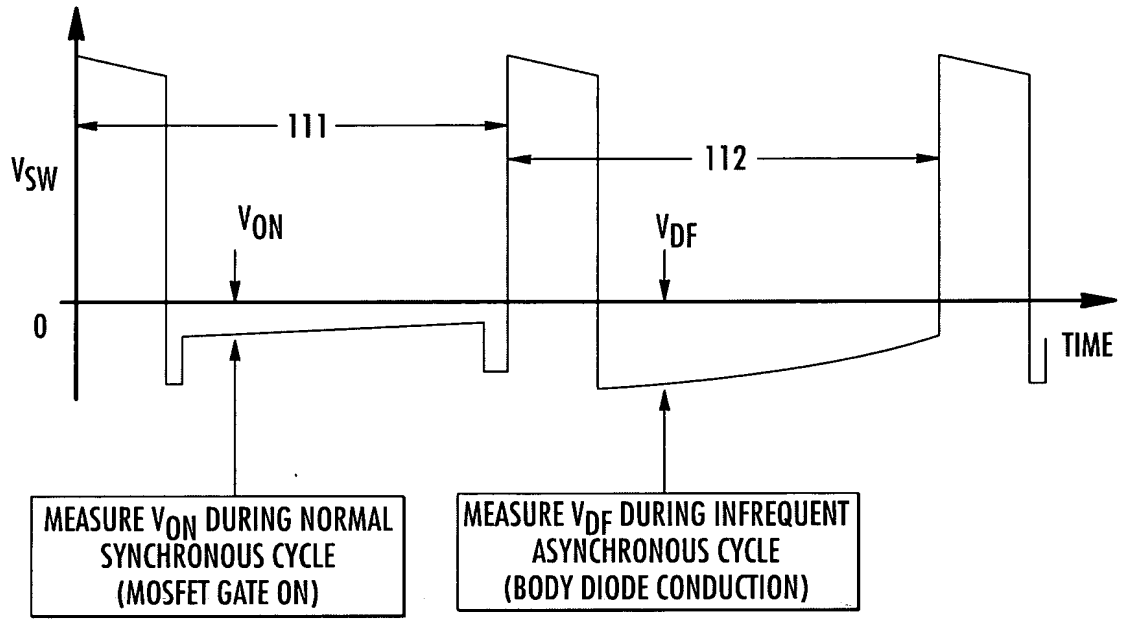

111
112
V_{SW}
V_{ON}
V_{DF}
0
TIME
MEASURE V_{ON} DURING NORMAL SYNCHRONOUS CYCLE (MOSFET GATE ON)
MEASURE V_{DF} DURING INFREQUENT ASYNCHRONOUS CYCLE (BODY DIODE CONDUCTION)

FIG. 11